Cerebro-Spinal Meningitis

Some Observations in a Recent Epidemic

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In presenting this paper to the Society I shall, as the title indicates, confine myself to clinical observations and the lessons that may be deduced therefrom. Time will not permit the discussion of the etiology, pathology, etc.

This paper is based on reports of seventy-three cases, twenty-three of which came under my personal observation while four were reported to me by friends and parents of the patients. The other forty-six cases were kindly furnished me by the following medical friends: the Drs. Harvey of Pittsburg, 5 cases; Dr. E. O. Sloan of Pittsburg, 4 cases; Drs. A. O. Blair and Wm. Williams of Pittsburg, 11 cases; Dr. Gregg, of Chicopee, Kas., 8 cases; Dr. D. B. Colcord, Frontenac, Kas., 4 cases; Dr. C. A. Fisher, Pittsburg, 4 cases; Dr. J. G. Sandidge, Mulberry, Kas., 6 cases; Dr. O. F. Lewis, Hepler, Kas., 2 cases; Dr. H. H. Boyle, of Pittsburg, Kas., 2 cases. I have the grestest confidence in their judgment and honesty and sincerely thank them for their assistance.

On account of the positive indication of contagion in the first 10 cases in this series, as well as in two others, I shall report these cases as fully as possible.

CASE 1.—Age 22 years. Died without medical attention. The only history I could elicit was, that she had been sick three weeks with a fever and had complained of headache and general muscular and joint pains. Father seemed to know but little about her, and the mother was physically unable to tell.

CASE 2.—Mrs. R., aged 38. Mother of Case 1, prescribed for her Dec. 14th, '98, but did not see her. Husband told me she had had a severe chill the night before followed by a high fever, intense headache and persistent vomiting. Saw her Dec. 15th at noon. Temperature 102, pulse 70. She was crying with a pain which she said was "boring from front to back of head." Marked rigidity of the spinal column, more especially cervical portion. Turning or moving in bed caused intense pain. This rigidity and inability to turn without pain lasting throughout her sickness. Her temperature after three or four days fell to 100 and so remained except during the 2nd week when she had a chill on alternate days, followed for a short time with a temperature of 102½ to 103 and this was followed in a few hours by a sweating stage, thus simulating a tertian malarial fever. I ad-

ministered quinine and after 4 or 5 days, chills ceased, and the temperature settled to 100 and 100½, and so remained until the end.

Her tongue at first moist, yellow central coat, with red margin, soon became dry, typhoid like, with sordes on teeth; but towards the close of 2nd week this condition improved.

Her respiration on several occasions were Cheyne-Stokes, especially marked towards the close. About the close of the 2nd week she picked at bed clothes and muttered. At this time she became quite deaf, especially in right ear which after a few days began to discharge a thin sanious matter. This condition continued though somewhat abated to the close. Her eyes were sensitive to light throughout. The action of heart at first corresponded with the temperature, though toward the close there was a decided weakening of the heart muscle and quickening of the pulse. For two or three days before death there had been an improvement of symptoms up to the evening before, when her respiration became decidedly irregular with what seemed to be a bronchial complication, death following in twelve hours. I was informed that just before her death severe contractions of limbs especially in the legs took place. Opisthotonous was increased. Convergent strabismus was observed and "purple and white spots" appeared on the body. Death occurred Jan 3, '99. Duration 21 days from initial chill. When I was called to Case 2, my attention was directed to Case 3.

Case 3.—A two year old daughter of Case 2, who had been sick for 10 days, commencing with what her father thought was a chill, followed by fever, which had been more or less persistent, the child being very cross and irritable, often crying in its sleep. Father said it had for the past day or two laid in one position unless changed, and it seemed to dread being moved. I observed that its head was somewhat retracted, eyes closed as though to avoid light, while the expression of its face was somewhat dull; the least touch would arouse it, and the least movement of it would cause it to cry out. Its temperature was 203, bowels tympanic and constipated; pulse weak and rapid. My prognosis was unfavorable. This child died two days later with extreme contractions of right side, having been sick 12 days. As these cases were county charges, the sanitary condition can be imagined. All the children slept in a very small bed-room with the sister while sick, who I believe was infected with meningitis.

Case 4.—Mr. D., age 78, saw him at 11 a.m. Dec. 24, '98.

Found him in a condition of collapse, almost pulseless, absolute coma, no stertor, but some irregularities of respiration. Pupils moderately dilated. Non-responsive to light. Temperature subnormal. Extremities cold. Was informed that he had a violent "marrow freezing" chill 12 hours before with vomiting and cramping. As he was obviously so near death, I gave him a hypodermic injection of strychnia and left him, informing the family that he would live but a few hours. I expressed the opinion that he was suffering from the so-called "winter cholera of influenza." He died at 1:30 p.m. the same day, living about 15 hours after the initial chill. Subsequently I learned that while his vomiting had been persistent, his bowels had acted but two or three times, and that while attempting to go to stool, he had fallen into the unconscious condition in which I found him. The cramps were muscular spasms. He had also complained of headache.

That night I was called to see his aged wife who was suffering from nervous excitement. I found the single room, which has but a single half window, and was used for all household purposes, occupied by no fewer than 30 persons, the corpse resting at one end. I need not add that the air was exceedingly foul smelling. To avoid repetition, I will state that the next six cases remained in this foul smelling room during the night.

Case 5.—Lottie D., age 11 years, grandson of Case 4, lived in same house. Saw him first Dec. 29, '99, at 9 p.m. Temperature 104, dilated pupils, slowly responded to light, pulse 100; considerable delirium. Semi-intelligence when spoken to; complained of headache; slight rigidity and tenderness of the spine.

History.—Came home from school the evening before complaining of stiffness of legs. At 11 o'clock that night (exactly 7 days after the initial chill of case 4) he had a chill followed by vomiting, high fever and three clonic convulsions. His temperature Friday morning had fallen to 102 and remained about this until the close. Near the end he had convergent strabismus of both eyes and decided rigidity. His respiration irregular, night terrors and violent delirium giving way to low muttering and final coma. The duration was 57 hours from initial chill.

Case 6.—Mrs. D., daughter-in-law of Case 4. Saw her first and only time an hour after I saw Case 5.

History.—The night before she had a violent chill, followed by vomiting and an intense headache which she described as "tearing and boring." It seemed to pass back and forth from occiput

to sinciput, causing her to scream. Her neck was decidedly rigid and drawn back, and the slightest movement of head caused great distress. Her pupils were moderately dilated. Eyes somewhat sensitive to light. She had a temperature of 100 although her pulse was but 40; skin moist and cool to touch. I warned her husband of her condition and advised him to secure another physician as they lived too far away for me to attend her. I learned from her relatives that she died nine days after initial chill.

CASE 7.—Thos. W., age 5 years, grandson of Case 4.

History.—Had chills December 30th, 31st and January 1st, about 10 a.m., of each day, each of which were followed by a severe headache and high fever, the headache following the last chill being especially severe. More or less rigidity of the neck from the first chill, on. Fever lasted but a few hours after chills, first and second, but after the third chill, fever was presistent, while attacks of headache increased in frequency and severity. During third chill, vomiting supervened and continued until January 4th, when I was called. He also had frequent night terrors. I found temperature 101, pulse 90; intensely dry, red tongue; pupils moderately dilated; patient with a tendency to sleep, but frequent awakening, crying with his head and always indicating the front, and often pulling his hair in his sleep. Conjunctiva injected, eyes red and somewhat swollen—photophobia; his face and body intensely dry, hyperemic and red, slighly albuminous urine simulating scarlet fever; never fully comatose, but was awakened with difficulty; after first week often complained of numbness of hands as well as of extreme coldness of feet and legs, although to the touch they seemed warm. About the close of the first week it was discovered that he could not articulate distinctly; he also at this time had some difficulty in swallowing. The red uncoated tongue persisted throughout, sometimes moist and sometimes dry. Obstinate constipation and frequent attacks of vomiting was kept up for four weeks. The pulse was variable —generally not increased His temperature for four weeks varied from 100 to 101½. Skin of chest and abdomen was always dry and harsh to touch, exfoliating since recovery.

The duration of this case is hard to determine. At the end of fourth week he was without fever, but cried with headache for two weeks longer; and at the close of two months, although somewhat improved in flesh and appearance, he had a recurrence of

most of the symptoms with a temperature of 101 for one day, since which time he has steadily improved, though at the present (April 20th) he has marked stiffness in both knees with slight inco-ordination.

CASE 8.—Lizzie W., age 9 years, granddaughter of Case 4, sister of Case 7.

History.—Sunday evening January 1st, had a chill followed by high fever, vomiting and intense headache. Saw her first Wednesday January 4th, temperature 102, pulse 120; intense headache "occipito frontal," she expressed it "my brains are coming out." Her neck was quite rigid and head somewhat retracted, tenderness over cervical spine; pupils dilated, slightly responding to light. Irritated conjunctiva, photophobia. She was so generally hyperesthetic for a week that she could not be removed from the bed. When she was raised to sitting posture she complained of extreme dizziness and frequently of double vision. About the close of the first week she experienced for several days great difficulty in swallowing. During second week she was absolutely unconscious for two days, when it was observed that she had convergent strabismus of left eye, and at this time Cheyne-Stokes respiration was also observed. Hearing impaired the third week. The only delirum observed in this case was "night terrors." The bowels, although requiring laxatives, were easily moved. Heart's action always rapid and alarming. The fever during the third and fourth week was intermittent and exacerbations being followed by sweating, sudamina developed on neck with large vesicles on back. Convalescent in five weeks.

CASE 9.—Baby W., age 15 months, grandson Case 4, brother Cases 7 and 8.

History.—Mother thinks it had a chill Sunday Jan. 1, 11 a.m. This chill was followed by vomiting, fever and intense redness of the skin, the redness lasting but a few hours. Fever and vomiting persistent. I saw him first Jan. 4th, temperature 103, pulse rapid photophobia, pupils dilated. So great was the hyperesthesia that child could not be moved except on a pillow and clothing was cut for removal. Marked rigidity of spine and retraction of head. Child cried out as if frightened when sleeping. Facial expression dull and indicating pain; vomiting occasionally. Temperature varying from 100 to 102 throughout; diarrhea persistent. This case, contrary to my prognosis, made a complete recovery in four weeks.

CASE 10.—Mr. L., age 29, son-in-law of Case 4 (reported to me

by his wife). "Had lagrippe for two weeks with soreness of stomach but was much improved, and Sunday, Jan. 1, said he felt well and started in a buggy to make a drive of nine miles, although the day was cold. When about three miles from home he began to experience the sensation of his lungs filling with cold air, with difficulty of breathing. Immediately he felt as though he was freezing and stopped at a house to warm. In an hour or so he started to return feeling as though his 'muscles were tearing'. On his arrival home his face was covered with purple and white spots and a very high fever which continued during the night. Next morning he complained of headache. A few minutes later or about five o'clock, he vomited and fell back unconscious. He was unable te speak but so violent were his struggles that it required several men to hold him in bed. At times he would lie with eyes closed as though the light irritated them. His tongue was dry and red and breathing irregular (she, his wife, described it as Cheyne-Stokes) and at last blowing; I believe he knew me until a short time before death as he would watch me and once when I was crying, tears rolled down his cheek." He died at 1:30 a.m., Jan. 3rd, living about 49 hours after his chill. Dr. Gregg informs me that he catheterized him, tested his urine and found albumen.

I take from my reports the following case, reported by Dr. Gregg:

CASE 52.—"Male, age 7 months, highest temperature 102; usual 100 to 101. Cheyne-Stokes respiration observed at different times; cried out in sleep and when moved; cervical rigidity; stupor; two or three convulsions near close; bowels constipated; intense hyperemia of the skin. Strabismus after the second week. Ear sensitive to noise. The disease is of especial interest as it nursed its mother after she was affected with the same disease. Duration of illness, three weeks. Death."

The following by Dr. Colcord:

CASE 56.—"Female, aged, 22 years. Initial chill; highest temperature 104½; intermittent; pulse 144; irregular; Cheyne-Stokes respiration. Intense occipital headache; general hyperesthesia; rigidity and retraction slight; violent delirium; profound coma on second and fifth days; tongue, dirty coat; diarrhea with involuntary actions. Characteristics: petechia eyes, intolerant of light; joints tender and rigidity of fingers, wrists and knees; retention of urine; died in five days. Contrary to my directions her child was allowed to nurse, and in seven days after the

mother died, the child became infected." (See Case 52.)

These 12 cases would indicate that this disease is contagious, where exposure was great enough and conditions favorable. The small bedroom in which cases 1, 2 and 3 slept, coupled with the unsanitary conditions as well as the close relation existing between child and mother. The crowded illy-ventilated room in which cases 4, 5, 6, 7, 8, 9 and 10 spent the night, and the nursing of mother by child as in cases 52, 56, would seem to supply all necessary conditions for contagion. The above cases seem not only to indicate contagion, but that the stage of incubation is from seven to ten days. This disease, however, must be mildly contagious, as all the other cases were single to a household, and in my own practice, no special attempt was made to isolate patients from the rest of the family, and exposures were numerous.

The initial chill was observed in 45 cases. Of those so affected, 30 cases died while 14 recovered, and one is still sick. When we consider the total number of deaths is 67 per cent. of total reported, and the deaths of those cases in which chills were observed is 66 per cent., we would decide that the chill has little prognostic value; but as the chill was observed but four times in children under 2 years of age, and 20 of that age have died, it would materially change the percentage.

Highest temperature, generally initial, noted in 70 cases.

	Cases.	*Died.*	*Recovered.*
Subnormal.....	3	2	1
Normal to 101.....	8	4	4
101 to 102.....	15	8	7
102 to 103.....	14	8	6
103 to 104.....	15	12	3
104 to 105.....	4	3	1
105 to 106.....	4	4	0
106 to 107.....	1	1	0
Noted as "high".....	6	6	0

It would seem by the above table that a high temperature would indicate an unfavorable prognosis.

The pulse has no special diagnostic nor prognostic value. My reports show that in eight cases it was below 60 beats per minute, four of these cases having a pulse of 40. Extreme rapidity was noted near the close of the fatal cases. Pulse does not conform to temperature wave.

Abnormal respiration was noted in 47 cases; Cheyne-Stokes

respiration was observed in 33 cases; in 17 just before death, in 16 earlier in the disease, four of the latter recovering. This would seem to indicate a very grave symptom. I also found in very young children, much diagnostic value attached thereto. Three cases had irregular respiration, one dying and two recovered. Three cases had stertor, one dying and two recovering. Two had labored respiration, one dying and one recovering. Five cases reported as having shallow and rapid respiration, four dying and one recovering. One case with sighing respiration recovered.

All the cases that were able to speak complained of headache, generally intense and severe. They are described as occipito-frontal, temporo-occipital and occipital. Of the cases in which 22 had headache classed as "intense," 16 died.

General hyperesthesia was noted in 38 cases. Moderate spinal rigidity was noted in 28 cases. Of these, 15 recovered; while marked rigidity was noted in 38 cases and only five recovered—thus indicating a very grave symptom. Retraction of head corresponded with rigidity of spine in extent and results.

General convulsions were noted in 20 cases. (Character of same not stated except in very few cases.) Of these, 19 died. Local convulsions as of arm or leg, nine cases, generally tonic, and in several instances followed by paralysis of the convulsed parts, of which only three cases recovered. In two cases, paresis of right side and four of left side was observed, while two of the above cases had facial paresis. In one case it was opposite from leg and arm and the other on the same side.

Violent delirium was noted in 10 cases, three of which recovered. Wild delirium in 10 cases, and only two recovered.

Low muttering in two cases and both died, while mild in two cases, and both recovered. Delirium character not stated in eight cases, three recovered. Night terrors in 14 cases, seven recovered.

Some degree of coma was noted in 32 cases. Sixteen cases as profound, 14 dying and two recovered, one coma vigil is still alive though not convalescent, (now dead); of the 15 cases reported as having "stupor" and "mild coma," eight died and seven recovered.

Vertigo was a symptom in 14 cases. Patients either falling or complaining of dizziness; of these cases nine died and five recovered.

Vomiting was noted in 53 cases, nine as initial only; 42 cases as initial and frequent, and two cases as appearing the second day. Of these cases 37 died and 16 recovered.

The condition of the tongue was noted in 56 cases, and is variously described as "coated;" 16 times, as "dirty-coated," 13 times, a "white-coat," 6 times, a "dirty-yellow or dirty-brown," 18 times, 3 cases had "red uncoated" tongues, while red edges and tips are mentioned 14 times. From these reports we are led to infer that in this disease we have no characteristic tongue.

The bowels as to action were noted in 60 cases; 42 were constipated, 9 had involuntary action (of these latter, 7 died and two recovered.) In three cases diarrhea and constipation alternated; four had diarrhea and involuntary action of bowels, while in but two cases, bowels were natural.

Twelve of the above cases were tympanic, and three had retracted abdominal bowels. (By an oversight in preparing report blanks these last two symptoms were not especially asked for.)

Of the skin symptoms, herpeslabialis was observed in 5 cases. Characteristic petechia was observed in 13 cases, all of which died.

Intense erythema, generally initial, was observed 9 times. Vesiculo-pustular blebs followed two cases. Large purplish spots in one case; rose-colored spots in one case; brown spots in two cases; sweating of the head alone 3 cases; and in one case, right side of the head only. Sudamina reported 4 times.

Symptoms of the eyes noted: photophobia was reported in 15 cases; dilated pupils in 24 cases; contracted pupils in 2 cases, while 2 cases were reported as variable, quickly changing from a state of contraction to dilatation and *vice versa*. Eighteen had strabismus, 16 convergent and 2 divergent. Only 1 of these cases recovered. Nystagmus was observed one time; ptosis 3 times and diplopia once. Argyle Robinson pupils 2 cases.

Hearing was notably impaired in 15 cases; 3 were hypersensitive to noise, and three had discharges from ear.

The urine was not generally examined; but albuminous urine was reported in 4 cases. Retention in 5 cases, and incontinence in 2 cases. Unfortunately, "Tache cerebrale" was not looked for in many cases. I observed it in 5 of my own cases, while in 3 other cases, comprising all that I examined. it was absent. Dr. Fisher observed it in all of his cases.

The total number of deaths were 49; of these, 27 were males, and 22 females. Total number of recoveries, 23; 16 males and 7 females, one male being still sick. Of those cases that died 4 are reported as dying within twelve hours; but as these cases were, with one exception, all small children, the initial chill was

not noticed, and errors could have been easily made. The exception was a boy 11 years old, who died 12 hours from the initial chill.

12 died between 12 and 24 hours, 5 on the second day, 3 on the third day, 6 on the fourth day, 6 on the fifth day, 1 on the seventh day, 3 the second week, 7 the third week, 4 the fourth week, 1 the fifth week, 1 the sixth week, 1 the seventh week.

One case recovered on the third day, 1 in one week, 8 during the second week, 2 during the third week, 5 during the fourth week, 4 during the fifth week, 1 the sixth week, 1 the seventh week and 1 the eighth week. Not believing in the existence of the so-called "abortive form," I regard with suspicion the diagnosis when patient recovers in first week, and I have eliminated from my report 12 cases observed in my own practice where symptoms subsided inside of one week. This is also the expression of almost all the gentlemen who have assisted me.

As to age: Of those 1 year and under, 15 cases, 7 males and 8 females, all died: of those between 1 and 2 years of age, 8 cases, 7 males and 1 female, all died except 3 males, and 1 of these will probably die. Or those between 2 and 5 years of age, 10 cases, 8 males and 2 females, 1 male and 2 females died; of those between the age of 5 and 10 years, 9 cases, 3 males and 6 females, 1 male and 4 females died.

The above would indicate that all ages are susceptible but that the age of the greatest susceptibility is from 3 months to 5 years, as this period furnishes us 33 cases, while the next 5 years furnish but 9 cases.

Sequelæ, were observed in but 7 cases: one boy 4 months after attack, had some rigidity of both knees, slight inco-ordination. Another, a girl 3 months after, has joint pains—rheumatoid. One has paresis of left arm with ptosis of left eye. Two cases have strabismus: another, a female 20 years old, has choreic movement, one has torticolis, another slight inco-ordination of muscular movement.

The treatment was necessarily symptomatic and varied. All agreed on the use of opium for the relief of pain, and in several cases marked tolerance of this drug was noted. Dr. Blair reports a case, a 7-year-old boy, who was, in what he considered, as almost a dying condition: stertorous respiration, marked rigidity with extreme opisthotonous, to whom he administered hypodermically within an hour ½ grain morpha-sulph., and an adult tube of aseptic ergot. The boy recovered. Three cases reported

were with two exceptions, confined to two townships of Crawford county. Almost entirely to the coal mining region, where the general sanitary conditions are not the best; and where most of the cases were the house sanitation was bad.

From the Pittsburg undertakers who do most of the work in this section, I learn that 60 cases died with meningitis and brain fever, 12 cases with lagrippe, (which was probably in these cases another name for meningitis), and (estimating) at least 18 buried elsewhere or cloaked under such names as "bronchitis" or "pneumonia" by incompetent physicians, I think a conservative estimate would be 90 deaths from this disease, or perhaps 140 or 150 cases.

Our per cent. of deaths (67⅛) large as compared with rates of other epidemics is doubtless explained by the elimination as above cited, of the so-called "abortive form."

Note.—"Since above was written, another of above cases died."